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THIRD ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

Note by the secretariat

I. INTRODUCTION

A. Mandate

1. Article 9 of the Convention states that the Subsidiary Body for Scientific and Technological Advice (SBSTA) is to provide the Conference of the Parties (COP) and, as appropriate, its other subsidiary bodies with timely information and advice on scientific and technological matters ... drawing upon existing competent international bodies.

2. At its fourteenth session, the SBSTA took note of the completion of the Third Assessment Report (TAR) of the Intergovernmental Panel on Climate Change (IPCC) and commended the IPCC on the high quality of its scientific work. It requested the secretariat to put the IPCC Third Assessment Report and the IPCC Synthesis Report on the agenda of the fifteenth session of the SBSTA.

B. Scope of the note

3. This note provides background information on the Third Assessment Report of the IPCC, including its Synthesis Report, with a view to facilitating its consideration by the SBSTA. It provides some general information on the report and identifies a number of issues relating to its uses, in particular to the possible future work of the subsidiary bodies. Given the large amount of information in the Third Assessment Report, this document provides only a brief introduction

to it and a few examples of how it may be relevant to the work of the SBSTA and other bodies of the Convention.

C. Possible action by the SBSTA

4. The SBSTA may wish to take note of this document, to determine how it wishes to assess and use the large amount of information in the TAR, to identify matters for further consideration and to agree on further action. It may also wish to call relevant issues to the attention of the Subsidiary Body for Implementation (SBI) and the COP.

II. BACKGROUND

5. The World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) established the IPCC in 1988. The role of the IPCC is to assess the scientific, technical and socio-economic information relevant for understanding the risks of human-induced climate change. It does not carry out new research nor does it monitor climate-related data. It bases its assessments mainly on published and peer-reviewed scientific technical literature.

6. The IPCC completed its First Assessment Report (FAR) in 1990. It was published in three volumes, each with a Summary for Policymakers (SPM).[1] The three reports provided information on the science, impacts of climate change and on response strategies. The FAR was presented at the second World Climate Conference, convened in Geneva in October 1990. A ministerial declaration at that conference called for negotiations on a climate convention to begin as soon as possible. In December 1990, the United Nations General Assembly accepted the IPCC report and established the Intergovernmental Negotiating Committee as the entity which would lead the creation of such a convention.

7. The IPCC provided additional scientific, technical and socio-economic advice to the world community in the early 1990s, particularly to the UNFCCC through its periodic special assessment reports on various aspects of the state of knowledge of the causes of climate change, its potential impacts, and options for response strategies. The IPCC provided a Second Assessment Report (SAR) in 1995, also in three volumes. In addition, a Synthesis Report was produced, based on the work of all three groups, relating to the interpretation of Article 2 of the Convention. Thus the full report, under the title "*IPCC Second Assessment: Climate Change 1995*", comprises four volumes.[2]

8. At its first session, in 1995, the SBSTA expressed strong support for the IPCC as one of the independent and prominent sources of scientific and technical information relevant to the

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[1] The FAR consisted of three volumes entitled: Volume 1: Scientific Assessment of Climate Change - Report of Working Group I, Volume 2: Impacts Assessment of Climate Change - Report of Working Group II, and Volume 3: The IPCC Response Strategies - Report of Working Group III.

[2] Volume 1: The IPCC Second Synthesis Assessment of Scientific-Technical Information Relevant to Interpreting Article 2 of the United Nations Framework Convention on Climate Change, Volume 2: The Science of Climate Change: Contribution of Working Group I of the IPCC, Volume 3: Scientific-Technical Analyses of Impacts, Adaptations and Mitigation of Climate Change: Contribution of Working Group II of the IPCC, and Volume 4: Economic and Social Dimensions of Climate Change: Contribution of Working Group III of the IPCC.

implementation of the Convention, as specified in Article 9 of the Convention (FCCC/SBSTA/1995/3). It was recognized that the SAR would include important information for the Convention, and would require priority attention at the second and future sessions of the SBSTA to enable it to provide relevant advice to the Ad Hoc Group on the Berlin Mandate as necessary (FCCC/AGBM/1995/2, para. 19 (f)) and to the Conference of the Parties (COP). In response to the request to provide a document on the SAR for the second session of the SBSTA, the secretariat provided a note with three addenda (FCCC/SBSTA/1996/7/Rev.1 and Add.1-3).[3] The conclusions of the third session of the SBSTA relating to its consideration of the IPCC Second Assessment Report may be found in document FCCC/SBSTA/1996/8, paragraphs 27-32.

III. STRUCTURE OF THE THIRD ASSESSMENT REPORT

9. The IPCC Third Assessment Report "Climate Change 2001" provides a comprehensive and up-to-date assessment of the policy-relevant scientific, technical and socio-economic dimensions of climate change. It concentrates on new findings since 1995, and pays greater attention to the regional (in addition to the global) scale, and to non-English literature.

10. The Third Assessment Report consists of reports of the three IPCC Working Groups (each with a brief Summary for Policymakers, a Technical Summary (TS), and a series of chapters) and the Synthesis Report. According to IPCC procedures, the Summaries for Policymakers were approved line by line by the respective working groups, and the underlying assessments were accepted. Working group I assessed the scientific aspects of the climate system and climate change. Working group II assessed the scientific, technical, environmental, economic and social aspects of the vulnerability (sensitivity and adaptability) to climate change of, and the negative and positive consequences (impacts) for, ecological systems, socio-economic sectors and human health, with an emphasis on regional, sectoral and cross-sectoral issues. Working Group III assessed the scientific, technical, environmental, economic and social aspects of the mitigation of climate change, and methodological aspects of cross-cutting issues (e.g. equity, discount rates and decision-making frameworks). All three reports contain a section in their SPM and TS focusing on the gaps in information and understanding that remain and how these might be addressed.

11. The contributions of the three working groups were published in July 2001 as:[4]

Volume 1: <u>Climate Change 2001: The Scientific Basis</u>

12. The volume was approved and accepted at the eighth session of Working Group I (WG I) in Shanghai, China on 20 January 2001. It contains fourteen chapters describing the current state of understanding of the physical climate system, the factors that drive climate change and the detection and the attribution of human influence on recent climate changes. The report also analyses past climate changes and presents projections of future climate changes, using a wide range of scenarios of future emissions of greenhouse gases and aerosols.

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[3] Also issued as FCCC/CP/1996/5 and Add.1-3.

[4] The term "volume" is used for convenience in this document. The IPCC reports are not identified as volumes.

Volume 2: Climate Change 2001: Impacts, Adaptation and Vulnerability

13. The volume was approved and accepted at the sixth session of Working Group II (WG II) in Geneva, Switzerland on 16 February 2001. It consists of nineteen chapters covering environmental, economic and social dimensions of climate change impacts, vulnerability and adaptation responses across a range of systems and sectors at regional and global scales. The scope of the current WG II report is broader than the scope of previous WG II assessments, which focused primarily on environmental and biophysical aspects of possible climate change impacts.

Volume 3: Climate Change 2001: Mitigation

14. The volume was approved and accepted at the sixth session of Working Group III (WG III) in Accra, Ghana on 3 March 2001. It contains ten chapters addressing potential technological and biological greenhouse gas emission reduction options to mitigate climate change, their costs and ancillary benefits, barriers to their implementation, and policies, measures and instruments to overcome such barriers. These issues are considered in the report in the broader context of development, equity and sustainability.

Volume 4: Climate Change 2001: Synthesis Report

15. This has been sent to governments for review and will be considered by the IPCC at its eighteenth session in Wembley, United Kingdom of Great Britain and Northern Ireland between 24-29 September 2001. The Synthesis Report is designed to address nine policy-oriented issues and should upon completion provide a convenient summary of information.

IV. GENERAL OBSERVATIONS

A. Introduction

16. The IPCC Third Assessment Report (TAR) is as an authoritative source of the best available information on the science, impacts, technological options and economics of climate change. Those interested in learning about - and acting upon - climate change have access to the best information that the scientific community can offer at this time.

17. In addition, the TAR is a useful input to the work of the Parties to the Convention and on the Kyoto Protocol, and particularly to any consideration of future response measures by Parties.

B. Availability of the report

18. A set of the TAR reports in English, and advance copies of the three SPMs and TSs in official languages of the United Nations, were made available to delegations at the resumed sixth session of the COP in Bonn in July 2001. The three SPMs and TSs will soon be available in all six languages of the United Nations on the IPCC web site. The three working group reports will be available in English on the IPCC web site as well as on CD-ROM.[5] The Synthesis Report will be available in English for delegates at the seventh session of the Conference of the Parties. It

[5] www.ipcc.ch

will also be translated into the other official languages of the United Nations and made available on the IPCC web site and on CD-ROM.

C. Representativeness of the report

19. The Third Assessment Report was prepared by authors from around the world. It was compiled by some 450 lead authors, scientists and technical experts from more than 100 countries between July 1998 and January-March 2001. In addition, some 800 contributing authors participated in developing the report. Teams of authors responsible for the preparation of each chapter included scientists and technical experts from developed and developing countries and countries in economic transition.

D. Review process

20. The report has been subject to IPCC peer review, involving governments, scientists and other specialists from governmental and non-governmental organizations. Drafts of the report were circulated twice for review: first to experts and then to both governments and experts. Comments from more than 1000 reviewers were considered and incorporated into the report under the guidance of about 80 review editors. Diverging scientific and technical views have been reflected. The revised reports of the three working groups along with SPMs and TSs were presented for consideration at sessions of the respective working group panels, in which more than 100 countries were represented. The panels approved the SPMs in detail and accepted the full reports, which remain the responsibility of the lead authors.

E. Use of the report

21. The IPCC reports have been used by scientists, climate change experts and policymakers. The Third Assessment Report is the most comprehensive evaluation of current scientific, technical, and socio-economic information on climate change since the Second Assessment Report in 1995. It is expected that the climate change community will make maximum use of the entire TAR including the TSs and the supporting chapters.

V. DISCUSSION

22. The TAR contains information with broad implications for the possible work of the SBSTA over the next few years. The subject matter is vast; hence any treatment in this document is of necessity limited to only a small portion of the IPCC material. The following subject matter is intended to stimulate the thinking of Parties in anticipation of a broad discussion by the SBSTA, particularly about aspects relevant to its future work. The following topics are examples, but they are not intended to be a comprehensive list of possible future activities.

Providing advice on scientific and technological matters relating to Article 2 of the Convention

23. The ultimate objective of the Convention, as expressed in Article 2, "is to achieve ... stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame to allow ecosystems to adapt naturally to climate change, to ensure that food

production is not threatened and to enable economic development to proceed in a sustainable manner."

24. The TAR provides new scientific information and evidence to contribute to the determination of what constitutes "dangerous anthropogenic interference with the climate system". It provides, first, new projections of future concentrations of greenhouse gases (GHGs) in the atmosphere, global and regional patterns of temperature and precipitation, and sea levels. It also explains that possibilities exist for abrupt and irreversible changes in ocean circulation and the major ice sheets. Second, it provides an assessment of the biophysical and socio-economic impacts of climate change, with regard to risks to unique and threatened systems, risks associated with extreme weather events, the distribution of impacts, aggregated impacts, and risks of large-scale, high impact events. Third, it provides an assessment of the technical and economic potential for achieving different levels of GHG concentrations in the atmosphere through mitigation, as well as information on how adaptation can reduce vulnerability, including the costs and benefits of various options. The TAR attempts to identify which findings are robust and what are the key uncertainties.

25. The basis for determining what constitutes "dangerous anthropogenic interference" will vary among regions and countries, depending on the local nature and consequences of climate change impacts, and also on the mitigative and adaptive capacity available to cope with climate change. The task of the IPCC is to provide policymakers with sound scientific information to make judgements as to what constitutes "dangerous anthropogenic interference" with the climate system. This value judgement rests collectively with the Parties to the UNFCCC, taking into account the scientific information provided and, among other factors, the principles contained in Article 3 of the Convention.

26. Since publication of the SAR, the Conference of the Parties has agreed to the Kyoto Protocol, although it is generally recognized that the Protocol will not prevent increases in global emissions, concentrations of GHGs or temperatures throughout this century. Volume 2 of the TAR synthesizes much information about the risks that are likely to evolve for different natural and man-made systems during the century as global mean annual temperature increases. With the information available in the TAR, Parties may wish to evaluate what constitutes "dangerous anthropogenic interference with the climate system" and how they wish to prevent it.

27. Questions: What advice might the SBSTA wish to provide to the COP concerning how to define "dangerous anthropogenic interference with the climate system"? What further steps should be undertaken to prevent "dangerous anthropogenic interference with the climate system"?

Supporting the efforts of Parties to undertake cooperative research under Articles 4.1 (g)(i) and Article 9.2 (a)(i) of the Convention

28. The TAR and its Synthesis Report contain descriptions of the current state of knowledge on the climate of the past and the present, together with an explanation of the current understanding of the forcing agents and processes in the climate system and how well they can be represented in climate models. Many factors continue to limit the ability to detect, attribute and understand current and future climate changes, as well as to assess climate change impacts, vulnerabilities and adaptation options. The SPM and the TS of the WG I report identify areas

where further work is needed. In a similar manner, WG II has identified areas where further research is needed with respect to assessing impacts, vulnerabilities and adaptation options. Collectively, the information prepared by these two working groups suggests that if better information is to be available for decision-making in the future, Parties will need to invest in research programmes, training of scientists and improving building scientific infrastructures in their countries. Information from the United States of America and the European Union suggests that support for global change research has remained nearly level or decreased slightly over the last five years.[6]

29. Questions: What role, if any, should the SBSTA play with regard to identifying assessing promoting research relating to climate change science and impacts, adaptation and vulnerability? What specific activities should be given priority, bearing in mind the roles of other international organizations and bodies and the capacities of the SBSTA?

Supporting the efforts of Parties to identify innovative, efficient and state-of-the-art technologies and know-how under Article 9.2 (d) of the Convention

30. Volume 3 of the TAR assesses a large body of information on technological options for reducing GHG emissions or enhancing sinks in various economic sectors and regions. It evaluates a range of barriers that impede the implementation of technologies, and describes what is known about the costs of various technical options at the global, national and sectoral levels. "Gaps in knowledge" are identified in the SPM and further elaborated in the TS of the report.

31. Volume 3 also provides substantial information on the emission scenarios of the IPCC Special Report on Emission Scenarios (SRES). The low emission scenarios, however, assume that significant technological advances are possible over the next several decades, particularly in the energy sector. These assumptions stand in marked contrast to actual expenditures by IEA member countries on energy research and developments which have decreased from approximately US$ 9 billion in 1990 and US$ 7.1 billion in 1998.[7]

32. Questions: What role, if any, should the SBSTA play with regard to addressing the "gaps in knowledge" identified in the WG III report, *inter alia*, with regard to furthering the exploration of regional, country and sectoral potentials for technological and social innovation options? Given the trends in government expenditures over the past decade, what should the SBSTA do to encourage investments in research and development on mitigation technologies, particularly for the energy sector?

Encouraging cooperation among Parties in preparing for adaptation to the impacts of climate change under Article 4.1(e)

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[6] The US Global Change Research Program had a research budget of US$ 1827.7 million in fiscal year 1995 and US$ 1695.0 million in fiscal year 2000. The budget for the Framework Programme on Climate research of the European Union was EUR 63 million in 1995 compared to EUR 70 million in 2001.

[7] Between 1990 and 1998, for example, expenditures for energy conservation research and development have increased from US$ 517 million to US$ 971 million, expenditures for fossil fuel research and development have decreased from US$ 1725 million to US$ 593 million, expenditures for nuclear research and development have decreased from US$ 4993 million to US$ 3627 million, and expenditures on renewable energy research and development have increased from US$ 549 million to US$ 586 million. See report by the International Energy Agency (IEA) entitled "Energy policies of IEA countries - 2000 review" for additional information.

33. Working Group II has identified and assessed the sensitivity, adaptive capacity and vulnerability of natural and human systems to climate change. It notes that the ability to adapt to climate change depends on factors such as wealth, technology, education, information, skill, infrastructure, access to resources and management capabilities. It briefly identifies possible adaptation options for sectors such as water resources, the coastal zone, ecosystems, human settlements, energy and industry, insurance and financial services and human health.

34. Question: What role, if any, should the SBSTA play regarding cooperation among Parties in developing methodologies to assess impacts and adaptation options, to exchange information on their experience with adaptation measures and to develop new management strategies and technologies?[8]

Providing advice on scientific and technological matters to the SBI and the COP relating to the implementation of the Convention under Article 9.1

35. Volume I of the TAR provides new information relating to tropospheric ozone, its precursors, and aerosols. These pollutants affect the radiative balance of the earth's atmosphere. It notes, for example, that tropospheric ozone is the third most important greenhouse gas after carbon dioxide (CO_2) and methane (CH_4), and that carbon monoxide (CO) is an important indirect GHG (100 Mt of CO is equivalent to about 5 Mt of CH_4). With regard to aerosols, it notes that significant progress has been achieved in characterizing the direct forcings of the major aerosols, particularly sulphates, biomass burning aerosols, and fossil fuel organic carbon and black carbon aerosols. The information may have implications for future mitigation strategies, but at a minimum for the collection and reporting, and subsequent review, of GHG data. It specifically relates to the ongoing work of the subsidiary bodies on the UNFCCC reporting guidelines for annual GHG inventories from Parties included in Annex I to the Convention, and possibly for other Parties as well.

36. The TAR also updates the Global Warming Potentials (GWPs) for many GHGs and provides GWPs for an expanded set new category of GHGs. The information may also have implications for future mitigation strategies as well as for the UNFCCC reporting guidelines for GHG inventories.

37. Question: Does the SBSTA wish to initiate a process for considering scientific information in the TAR, e.g. on tropospheric ozone, including its precursors, aerosols and the updated information on GWPs, with the aim of informing the SBI about aspects relevant to the implementation of the Convention, and if so, how?

38. Volume 3 of the TAR provides a large collection of new information on options to reduce GHG emissions and enhance sinks. Much of the information may be relevant to the development of national strategies and in the preparation of national communications by Parties to the Convention. For example, Annex I Parties may find the information helpful in the development of national policies and measures and in the preparation of projections of GHG emissions. In addition, the information in Volume 3 of the TAR may be useful to Parties not included in Annex I to the Convention (non-Annex I Parties) in the preparation of project proposals for submission to the Global Environment Facility.

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[8] Also see document FCCC/SBSTA/2001/INF.4

39. Questions: Should the SBSTA encourage or request Parties to consider the information on technologies in Volume 3 of the TAR in the preparation of national communications under the Convention, and if so, how? Should the SBSTA encourage non-Annex I Parties to consider the IPCC information on technologies in the preparation of projects as noted above. Should the SBSTA take steps to expand the information on the new technologies in Volume 3 of the TAR, and if so, for what purpose?

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